

EGU21-183

<https://doi.org/10.5194/egusphere-egu21-183>

EGU General Assembly 2021

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Distribution of iron porphyrin like complexes along the land sea continuum of the Iroise Sea

Agathe Laes¹, Gabriel Dulaquais², Alexandre Hemery¹, Matthieu Waeles², Romain Davy¹, Jeremy Devesa², Ricardo Riso², and Stefan Lalonde³

¹Ifremer, LDCM/RDT, Plouzane, France (agathe.laes@ifremer.fr)

²LEMAR, IUEM, Plouzane, France (gabriel.dulaquais@univ-brest.fr)

³LGO, IUEM, Plouzane, France (Stefan.Lalonde@univ-brest.fr)

The aim of FeLINE project (Fer Ligands In the aulNe Estuary) was to determine the distribution of iron and associated ligands concentrations along the land sea continuum of the Iroise Sea (Bay of Brest, France). Iron porphyrin like ligands (Fe-Py) such as heme and hemoproteins are relevant complexes in iron biogeochemical cycling as they can persist in seawater and on marine particulates. This work reveals for the first time the distribution of Fe-Py concentrations (dissolved plus reactive particulate) along a temperate macrotidal estuary. Unfiltered samples were collected in October 2019 across a transect of the Aulne river and estuary / Rade of Brest / Iroise Sea during low tidal coefficient (39). Fe-Py concentrations were determined using flow injection analysis with chemiluminescence detection adapted from Vong et al. (2007). Various interferences (organic, metallic, pH and salinity) were tested. The detection limit attained was 11 pmol.l⁻¹ and the time of analysis 1min30s per sample. The Fe-Py concentrations varied from 0.007 ±0.002 nmol.l⁻¹ for S=33.98 and 1.177 ±0.007 nmol.l⁻¹ for S = 0.92. The Fe-Py concentrations clearly showed a non-conservative behavior due to various processes other than simple mixing of natural and seawater. The highest values revealing a Fe-Py enrichment were observed in the Estuarine Turbidity Maximum (ETM) for which concentrations varied between 1.177 ±0.007, S = 5.2 and 0.738 ±0.004 nmol.l⁻¹ S = 8.59. This positive anomaly of Fe-Py concentrations (40%) also corresponded to the lowest pH values (pH =7.27-7.32). The distal part of the transect displayed a negative anomaly for salinities comprised between 15 and 25 (loss of 37%). The four last points geographically corresponding to the Bay of Brest (S>35) exhibited low and stable Fe-Py concentrations of 0.007±0.002 and 0.024 ± 0.003 nmol.l⁻¹. The supply and removal fluxes were respectively estimated at 2.4±0.2g/d and 8.1 ± 0.8g/d, revealing an average Fe-Py removal of 39.8% that is probably due to particle flocculation.